Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) [[A]] An all-dielectric waveguide comprising:

a dielectric core region extending along a waveguide axis; and

a dielectric confinement region surrounding the core about the waveguide axis, the confinement region comprising alternating layers of at least two different dielectric materials surrounding the core about the waveguide axis, wherein during operation the confinement region guides EM radiation in at least a first range of frequencies to propagate along the waveguide axis in the core,

wherein the core has an average refractive index smaller than about 1.3 for a frequency in the first range of frequencies, ~~and~~

wherein the core has a diameter in a range between about 4λ and 80λ, wherein λ is a wavelength corresponding to a central frequency in the first frequency range, and

wherein the refractive indices and thicknesses of at least some of the alternating dielectric layers substantially satisfy the following equality:

$$\frac{d_{hi}}{d_{lo}} = \frac{\sqrt{n_{lo}^2 - 1}}{\sqrt{n_{hi}^2 - 1}}$$

where d_{hi} and d_{lo} are the thicknesses of adjacent higher-index and lower-index layers, respectively, and n_{hi} and n_{lo} are the refractive indices of the adjacent higher-index and lower-index layers, respectively.

Claims 2 – 62 are Cancelled.

63. (Currently Amended) [[A]] An all-dielectric waveguide comprising:

a dielectric core region extending along a waveguide axis; and

a dielectric confinement region surrounding the core about the waveguide axis, the confinement region comprising alternating layers of at least two different dielectric materials surrounding the core about the waveguide axis and guiding EM radiation in at least a first range of frequencies to propagate along the waveguide axis in the core,

wherein the core has an average refractive index smaller than about 1.3 for a frequency in the first range of frequencies, ~~and~~

wherein the core has a diameter in a range between about 5 microns and 170 microns; and

wherein the refractive indices and thicknesses of at least some of the alternating dielectric layers substantially satisfy the following equality:

$$\frac{d_{hi}}{d_{lo}} = \frac{\sqrt{n_{lo}^2 - 1}}{\sqrt{n_{hi}^2 - 1}}$$

where d_{hi} and d_{lo} are the thicknesses of adjacent higher-index and lower-index layers, respectively, and n_{hi} and n_{lo} are the refractive indices of the adjacent higher-index and lower-index layers, respectively.

64. (Currently Amended) The waveguide of claim 63, wherein the core has a ~~diamater~~ diameter in a range between about 7 microns and 170 microns.

65. (Currently Amended) The waveguide of claim 63, wherein the core has a ~~diamater~~ diameter in a range between about 10 microns and 170 microns.

Claims 66 – 72 are Cancelled.

73. (Previously Presented) The waveguide of claim 1, wherein the waveguide supports a mode in which at least 99% of the average energy of the propagating EM radiation is in the core for a frequency in the first range of frequencies.

74. (Currently Amended) The waveguide of claim 1, wherein the ratio of the bandwidth of the first range of frequencies and the central frequency ~~and~~ is at least about 10%.

75. (Previously Presented) The waveguide of claim 1, wherein the confinement region guides at least one mode to propagate along the waveguide axis with radiative losses less than 1.0 dB/km for a frequency in the first range of frequencies.

76. (Previously Presented) The waveguide of claim 1, wherein the confinement region guides at least one mode to propagate along the waveguide axis with radiative losses less than 0.1 dB/km for a frequency in the first range of frequencies.

77. (Previously Presented) The waveguide of claim 1, wherein the core comprises a gas.

78. (Previously Presented) The waveguide of claim 1, wherein the first range of frequencies corresponds to wavelengths in the range of about 1.2 microns to 1.7 microns.

79. (Previously Presented) The waveguide of claim 1, wherein the first range of frequencies corresponds to wavelengths in the range of about 0.7 microns to 0.9 microns.

80. (Previously Presented) The waveguide of claim 1, wherein the ratio of the refractive index of the two different dielectric materials in the dielectric confinement region is greater than 1.5.

81. (Previously Presented) The waveguide of claim 1, wherein the dielectric confinement region is sufficient to cause EM radiation that is incident on the confinement region from the core in the first frequency range and with any polarization to have a reflectivity for a planar geometry that is greater than 95% for angles of incidence ranging from 0° to at least 80°.

82. (Previously Presented) The waveguide of claim 1, wherein a lower-index one of the different dielectric materials comprises a polymer or a glass.

83. (Previously Presented) The waveguide of claim 1, wherein a higher-index one of the dielectric material comprises germanium, tellurium, or a chalcogenide glass.

84. (Previously Presented) The waveguide of claim 1, wherein the diameter of the core is in the range of about 8λ and 80λ.

85. (Previously Presented) The waveguide of claim 1, wherein the diameter of the core is in the range of about 4λ and 60λ.

86. (Previously Presented) The waveguide of claim 1, wherein the diameter of the core is in the range of about 5λ and 60λ.

87. (Previously Presented) The waveguide of claim 1, wherein the diameter of the core is in the range of about 6λ and 40λ.

88. (Previously Presented) The waveguide of claim 1, wherein the diameter of the core is in the range of about 8λ and 40λ.

89. (Currently Amended) [[A]] An all-dielectric waveguide comprising:

a dielectric core region extending along a waveguide axis; and

a dielectric confinement region surrounding the core about the waveguide axis, the confinement region comprising alternating layers of at least two different dielectric materials surrounding the core about the waveguide axis,

wherein during operation the confinement region guides EM radiation in at least a first range of frequencies to propagate along the waveguide axis in the core to have radiative losses less than 1.0 dB/km for a frequency in the first range of frequencies,

wherein the core comprises a gas and has an average refractive index smaller than about 1.3 for a frequency in the first range of frequencies,

wherein the core has a diameter in a range between about 4λ and 80λ, wherein λ is a wavelength corresponding to a central frequency in the first frequency range, ~~and~~

wherein a ratio of a refractive index of a high-index one of the two dielectric materials in the dielectric confinement region for the central frequency to that of a low-index one of the two dielectric materials is greater than 1.5, and

wherein the refractive indices and thicknesses of at least some of the alternating dielectric layers substantially satisfy the following equality:

$$\frac{d_{hi}}{d_{lo}} = \frac{\sqrt{n_{lo}^2 - 1}}{\sqrt{n_{hi}^2 - 1}}$$

where d_{hi} and d_{lo} are the thicknesses of adjacent higher-index and lower-index layers, respectively, and n_{hi} and n_{lo} are the refractive indices of the adjacent higher-index and lower-index layers, respectively.

90. (Previously Presented) The waveguide of claim 65, wherein

during operation the confinement region guides EM radiation in at least a first range of frequencies to propagate along the waveguide axis in the core to have radiative losses less than 1.0 dB/km for a frequency in the first range of frequencies,

the core comprises a gas, and

a ratio of a refractive index of a high-index one of the two dielectric materials in the dielectric confinement region for a central frequency in the first frequency range to that of a low-index one of the two dielectric materials is greater than 1.5.